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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/736,501	12/17/2003	Jianming Wu	71493-1226 /pw	6276

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EXAMINER

BALAOING, ARIEL A

ART UNIT	PAPER NUMBER
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2617

DATE MAILED: 08/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/736,501	Applicant(s) WU ET AL.	
	Examiner Ariel Balaoing	Art Unit 2617	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 5-24 and 26-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 8-10 and 16 is/are allowed.
- 6) ☒ Claim(s) 5-7, 11-15, 17-24 and 26-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 06/22/2006 has been entered.

Response to Arguments

2. Applicant's arguments with respect to claims 5-7, 11-15, 17-24, and 26-31 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 6 and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 6 recites the limitation "wherein scheduling transmission to the receivers further comprises scheduling **the high priority receivers** before scheduling **the high priority receivers**" on lines 4-5 of the claim. It is unclear as to which receivers are being scheduled.

Claim 17 is indefinite as it is dependent on cancelled claim 2.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claims 5-7, 11, 13-15, 17, 20-22, 24, 26, 28, 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over WONG et al (US 6,330,460 B1) in view of SCHERZER et al (US 6,895,258 B1).

Regarding claim 5, WONG discloses determining an angle of departure for each of the plurality of receivers (col. 7, line 48-67; col. 10, line 7-36; angular spacing determined for each mobile using reverse and forward link); scheduling transmission to receivers based upon separation between angles of departure between scheduled receivers, wherein a minimum angle of separation constraint is imposed that requires any two receivers which are scheduled during a given scheduling interval to have angles of departure separated by at least a first minimum angle of separation (abstract; col. 7, line 48-67; col. 8, line 27-53; minimum angular spacing relative to the base station is required); wherein the scheduling transmission to the receivers comprises: a) scheduling a first receiver (col. 7, line 48-67); determining a receiver of remaining receivers and scheduling that receiver subject to the constraint (col. 7, line 28-col. 8, line 53). However, WONG does not expressly disclose determining a receiver which has a largest angle of separation with previously scheduled receivers. SCHERZER discloses determining a receiver which has a largest angle of separation with previously scheduled receivers (col. 6, line 65-col. 7, line, 5; subscriber relatively isolated in angle

is scheduled more frequently). Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify WONG to include the teachings of SCHERZER, since SCHERZER states at col. 7, line 3-5 that such a modification would increase system throughput.

Regarding claim 6, see the rejections of the parent claim concerning the subject matter this claim is dependent upon. WONG further discloses further comprising for each scheduling interval: logically dividing the receivers into low priority receivers and high priority receivers (col. 4, line 56-col. 5, line 30); wherein scheduling transmission to the receivers further comprises scheduling the high priority receivers before scheduling the low priority receivers (col. 4, line 56-col. 5, line 30; data serves a group having a highest aggregate data throughput during remainder of the service cycle).

Regarding claim 7, see the rejections of the parent claim concerning the subject matter this claim is dependent upon. WONG further discloses further comprising for each scheduling interval: logically dividing the receivers according to at least three groups (col. 4, line 40-45); wherein scheduling transmission to the receivers further comprises scheduling the groups of receivers (col. 4, line 56-61). However, WONG does not expressly disclose wherein each group has a priority ranging from lowest to highest; and scheduling the groups of receivers in decreasing order of plurality. SCHERZER wherein each group has a priority ranging from lowest to highest (col. 18, line 24-col. 19, line 31; col. 19, line 44-col. 20, line 24); and scheduling the groups of receivers in decreasing order of plurality (col. 18, line 24-col. 19, line 31; col. 19, line 44-col. 20, line 24). Therefore it would have been obvious to a person of ordinary skill in

the art at the time the invention was made to modify WONG to include the teachings of SCHERZER, as priority transmission can be provided to systems deemed urgent.

Regarding claim 11, see the rejections of the parent claim concerning the subject matter this claim is dependent upon. WONG further discloses applied to each of a plurality of sectors being serviced by a wireless network node (Figure 3; col. 13, line 47-62).

Regarding claim 13, see the rejections of the parent claim concerning the subject matter this claim is dependent upon. WONG further discloses determining if there is any pair of receivers of different sectors which have angles of departure separated by less than a second minimum angle of separation (col. 7, line 48-67; col. 8, line 27-53; col. 11, line 12-67; grouping of the mobiles is applied to the 3 sectors of the base station); for each such pair of receivers, elimination one of the pair of receivers from consideration for scheduling (col. 11, line 12-67; compatible combinations are formed).

Regarding claim 14, see the rejections of the parent claim concerning the subject matter this claim is dependent upon. WONG further discloses wherein the one of the pair of receivers eliminated from consideration is selected on the basis of cumulative throughput, with the receiver having higher cumulative throughput being eliminated (238-Figure 9; col. 11, line 12-67; average rate of transfer of data from a base station).

Regarding claim 15, see the rejections of the parent claim concerning the subject matter this claim is dependent upon. WONG further discloses at a beginning of scheduling for each scheduling interval, eliminating at least one receiver from consideration for scheduling (col. 11, line 12-67).

Regarding claim 17, see the rejections of the parent claim concerning the subject matter this claim is dependent upon. WONG further discloses wherein the multi-beam transmitter comprises an adaptive beamforming transmitter, the method further comprising performing adaptive beamforming for the scheduled receivers (abstract; adaptive antenna array).

Regarding claim 20, see the rejections of the parent claim concerning the subject matter this claim is dependent upon. WONG further discloses a transmitter adapted to implement a method according to claim 5 (Figure 2, 3).

Regarding claim 21, see the rejections of the parent claim concerning the subject matter this claim is dependent upon. WONG further discloses a transmitter according to claim 20 in the form of a network access point (Figure 2, 3).

Regarding claim 22, see the rejections of the parent claim concerning the subject matter this claim is dependent upon. WONG further discloses a system comprising: a wireless network node adapted to implement a method according to claim 5; a plurality of receivers (Figure 2, 3).

Regarding claim 24, see the rejections of the parent claim concerning the subject matter this claim is dependent upon. WONG further discloses a computer readable medium having instructions stored thereon for implementing a method according to claim 5 (abstract; col. 4, line 28-62).

Regarding claim 26, WONG further a transmitter comprising: a multi-beam antenna (Figures 2, 3); a scheduler adapted to determine an angle of departure for each of a plurality of receivers and to schedule transmission to each receiver on an

appropriate beam of the multi-beam antenna based upon separation between angles of departure between scheduled receivers (col. 7, line 48-67; col. 10, line 7-36; angular spacing determined for each mobile using reverse and forward link); wherein a minimum angle of separation constraint is imposed that requires any two receivers which are scheduled during a given scheduling interval to have angles of departure separated by at least a first minimum angle of separation (abstract; col. 7, line 48-67; col. 8, line 27-53; minimum angular spacing relative to the base station is required); wherein the scheduler is adapted to schedule transmission to each receiver by scheduling a first receiver (col. 7, line 48-67); determining a receiver of remaining receivers and scheduling that receiver subject to the constraint (col. 7, line 28-col. 8, line 53). However, WONG does not expressly disclose determining a receiver which has a largest angle of separation with previously scheduled receivers. SCHERZER discloses determining a receiver which has a largest angle of separation with previously scheduled receivers (col. 6, line 65-col. 7, line, 5; subscriber relatively isolated in angle is scheduled more frequently). Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify WONG to include the teachings of SCHERZER, since SCHERZER states at col. 7, line 3-5 that such a modification would increase system throughput.

Regarding claim 28, see the rejections of the parent claim concerning the subject matter this claim is dependent upon. WONG further discloses wherein the multi-beam antenna is an adaptive beamforming antenna (abstract).

Regarding claim 31, see the rejections of the parent claim concerning the subject matter this claim is dependent upon. WONG further discloses a transmitter according to claim 26 in the form of a network access point ().

7. Claims 12 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over WONG et al (US 6,330,460 B1) in view of SCHERZER et al (US 6,895,258 B1) as applied to the parent claims above, and further in view of HSU et al (US 2004/0063438 A1).

Regarding claims 12 and 23, see the rejections of the parent claims concerning the subject matter these claims are dependent upon. WONG and SCHERZER further disclose wherein the wireless network node is a network access point (SCHERZER- col. 3, line 56-col. 4, line 4; WONG- Figure 3; col. 13, line 47-62). However, the combination of WONG and SCHERZER does not disclose wherein each receiver is a local access point. HSU discloses wherein each receiver is a local access point (paragraph 45). Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the combination of WONG and SCHERZER to include local access point as receivers, as taught by HSU, as this allows a single controller to direct communication to all systems available for transmission.

8. Claims 18, 19, 29, 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over WONG et al (US 6,330,460 B1) in view of SCHERZER et al (US 6,895,258 B1) and in further view of GORANSSON (US 2004/0121810 A1).

Regarding claim 18, see the rejections of the parent claim concerning the subject matter this claim is dependent upon. WONG further discloses wherein the multi-beam

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transmitter generates a plurality of beams which are individually directable, the method further comprising directing each of the beams (abstract; col. 4, line 28-63). However, the combination of WONG and SCHERZER does not expressly disclose the use of a fixed multi-beam transmitter that generates substantially fixed beams. GORANSSON discloses the use of a fixed multi-beam transmitter that generates substantially fixed beams (Figure 4; paragraph 41-44). Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the combination of WONG and SCHERZER to include the teachings of GORANSSON, as the use of fixed beam transmitters that generate substantially fixed beams is well known in the art of beamforming.

Regarding claim 19, see the rejections of the parent claim concerning the subject matter this claim is dependent upon. WONG further discloses wherein the multi-beam transmitter generates an array of beams which are collectively steerable to a plurality of fixed rotational states, and individually activatable (abstract; col. 4, line 28-63). However, the combination of WONG and SCHERZER does not expressly disclose the use of a fixed multi-beam transmitter that generates substantially fixed beams. GORANSSON discloses the use of a fixed multi-beam transmitter that generates substantially fixed beams (Figure 4; paragraph 41-44). Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the combination of WONG and SCHERZER to include the teachings of GORANSSON, as the use of fixed beam transmitters that generate substantially fixed beams is well known in the art of beamforming.

Regarding claim 29, see the rejections of the parent claim concerning the subject matter this claim is dependent upon. However, the combination of WONG And SCHERZER does not expressly disclose wherein the multi-beam antenna is a fixed steering beam antenna. GORANSSON discloses wherein the multi-beam antenna is a fixed steering beam antenna (Figure 4; paragraph 41-44). Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the combination of WONG and SCHERZER to include the teachings of GORANSSON, as the use of fixed beam transmitters that generate substantially fixed beams is well known in the art of beamforming.

Regarding claim 30, see the rejections of the parent claim concerning the subject matter this claim is dependent upon. WONG further discloses wherein the multi-beam antenna generates a plurality of beams which are individually directable (abstract; col. 4, line 28-63). However, the combination of WONG and SCHERZER does not expressly disclose the use of a fixed multi-beam transmitter that generates substantially fixed beams. GORANSSON discloses the use of a fixed multi-beam transmitter that generates substantially fixed beams (Figure 4; paragraph 41-44). Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the combination of WONG and SCHERZER to include the teachings of GORANSSON, as the use of fixed beam transmitters that generate substantially fixed beams is well known in the art of beamforming.

9. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over WONG et al (US 6,330,460 B1) in view of SCHERZER et al (US 6,895,258 B1) and in further view of AGEE et al (US 2004/0095907 A1).

Regarding claim 27, see the rejections of the parent claim concerning the subject matter this claim is dependent upon. Although WONG disclose determining an angle of departure using forward and reverse links (col. 10, line 7-36), the combination of WONG and SCHERZER does not expressly disclose wherein the scheduler is adapted to determine an angle of departure for each receiver by receiving an angle of arrival information from each receiver, and deriving the angle of departure from the angle of arrival information. AGEE discloses wherein the scheduler is adapted to determine an angle of departure for each receiver by receiving an angle of arrival information from each receiver, and deriving the angle of departure from the angle of arrival information (paragraph 65, 66). Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the combination of WONG and SCHERZER to calculate the angle of departure using angle of arrival information, as taught by AGEE, as this is a well known technique used in beam forming networks.

Allowable Subject Matter

10. Claims 8-10, 16 are allowed.

11. The following is an examiner's statement of reasons for allowance:

Regarding independent claim 8, claim 8 is allowable for the reasons set forth in the Office Action filed 01/31/2006.

Claims 9, 10, and 16 are allowable as being dependent on independent claim 8

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ariel Balaoing whose telephone number is (571) 272-7317. The examiner can normally be reached on Monday-Friday from 8:00 AM to 4:30 AM.

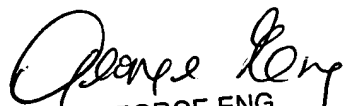
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, George Eng can be reached on (571) 272-7495. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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SUPERVISORY PATENT EXAMINER